10/716,829

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*** YOU HAVE NEW MAIL ***

=> s nanoparticles and oligonucleotide
L1        4439 NANOPARTICLES AND OLIGONUCLEOTIDE

=> s l1 and polythiol
L2          18 L1 AND POLYTHIOL

=> dup rem l2
PROCESSING COMPLETED FOR L2
L3           17 DUP REM L2 (1 DUPLICATE REMOVED)

=> d l3 bib abs 1-17

L3   ANSWER 1 OF 17  WPIDS COPYRIGHT 2006       THE THOMSON CORP on STN
AN   2006-649242 [68]   WPIDS
DNC  C2006-199191 [68]
DNN  N2006-523542 [68]
TI   Detecting nucleic acid, by providing nanoparticles having
     oligonucleotides attached to it, with sequence complementary to target
     nucleic acid, contacting nucleic acid and nanoparticles, and
     observing change caused by hybridization
DC   B04; D16; S03
IN   ELGHANIAN R; LETSINGER R L; LI Z; MIRKIN C A; MUCIC R C; PARK S; STORHOFF
     J J; TATON T A
PA   (NANO-N) NANOSPHERE INC
CYC  1
PIA  AU 2006200261   A1 20060209 (200668)* EN  405[59]
ADT  AU 2006200261 A1 Div Ex AU 2001-255203 20010328; AU 2006200261 A1 AU
     2006-200261 20060120
PRAI AU 2006-200261       20060120
     AU 2001-255203       20010328
AN   2006-649242 [68]   WPIDS
AB   AU 2006200261 A1   UPAB: 20061023
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NOVELTY - Detection of nucleic acid having specific sequence, involves providing type of nanoparticles having oligonucleotides attached to it, the oligonucleotides on each nanoparticle having sequence complementary to sequence of at least two portions of target nucleic acid; contacting nucleic acid and nanoparticles under conditions effective to allow hybridization of oligonucleotides on nanoparticles with two or more portions of nucleic acid; and observing detectable change brought about by hybridization of oligonucleotides on nanoparticles with nucleic acid.

DETAILED DESCRIPTION - INDEPENDENT CLAIMS are included for:

(1) nucleic acid detection kit;

(2) an aggregate probe comprising at least two types of nanoparticles having oligonucleotides attached to it, where the nanoparticles of the aggregate probe are bound to each other as a result of the hybridization of some of the oligonucleotides attached to them, and at least one of the types of nanoparticles of the aggregate probe have attached to it, oligonucleotides having a sequence complementary to a portion of the sequence of the nucleic acid, or having a hydrophobic group attached to the end not attached to the nanoparticle;

(3) core probe comprising at least two types of nanoparticles having oligonucleotides attached to it, where the nanoparticles of the core probe are bound to each other as a result of the hybridization of some of the oligonucleotides attached to them;

(4) a substrate having nanoparticles attached to it;

(5) a metallic or semiconductor nanoparticle having fluorescently labeled oligonucleotides, attached to it;

(6) a satellite probe comprising a particle having oligonucleotides including nucleic acid complementary portions, and probe oligonucleotides hybridized to the oligonucleotides attached to the nanoparticles , where the probe oligonucleotides has a first portion having a sequence complementary to portion of oligonucleotides attached to the particles, second portion has nucleic acid complementary sequence and a reporter molecule;

(7) nano-fabrication (immobilization of oligonucleotides to nanoparticles);

(8) nanomaterials or nanostructures composed of nanoparticles having oligonucleotides attached to it;

(9) composition comprising nanoparticles having oligonucleotides attached to it;

(10) an assembly of containers comprising above-cited nanoparticles;

(11) a nanoparticle having several different oligonucleotides attached to it, or oligonucleotides comprising at least one type of recognition oligonucleotides and optionally type of diluent oligonucleotide, each of the recognition oligonucleotides comprising a spacer portion and a recognition portion, the spacer portion being designed so that it is bound to the nanoparticles, the recognition portion having a sequence complementary to at least one portion of the sequence of a nucleic acid or another oligonucleotide;

(12) separating a selected nucleic acid having at least two portions, from other nucleic acids;

(13) binding oligonucleotides to charged nanoparticles to produce stable nanoparticle-oligonucleotide conjugates;

(14) nanoparticle-oligonucleotide conjugates which are nanoparticles having oligonucleotides attached to it, the oligonucleotides being present on surface of the nanoparticles at a surface density sufficient so that the conjugates are stable, at least some of the oligonucleotides having a sequence complementary to at least one portion of the sequence of a nucleic acid or another oligonucleotide;

(15) nanomaterials or nanostructures composed of oligonucleotide conjugates, or the above-cited

nanoparticles being held together by oligonucleotide connectors;

(16) oligonucleotide having a covalently bound cyclic disulfide or polythiol functional group that can bind to nanoparticles;

(17) aggregate probe for detecting an analyte;

(18) detecting an analyte in a sample;

(19) detecting a polyvalent analyte;

(20) kit for detecting an analyte;

(21) preparation of nanoprobe conjugate for detecting an analyte; and

(22) a nanomaterial produced by the method.

USE - For detecting nucleic acid such as viral RNA or DNA, gene associated with a disease, or bacterial DNA or fungal DNA from a biological source. The nucleic acid is a synthetic DNA, synthetic RNA, structurally-modified natural or synthetic RNA, or a structurally-modified natural or synthetic DNA (all claimed). Also useful for diagnosing and/or monitoring viral diseases (e.g. HIV and hepatitis virus), bacterial diseases (e.g. tuberculosis and Lyme disease), and sexually transmitted diseases and cancer; in DNA sequencing for paternity testing; in forensics, for cell line authentication for monitoring gene therapy, etc., and for monitoring treatment.

ADVANTAGE - Enables rapid, simple and cost-effective detection of nucleic acid having specific sequence, as it does not require specialized or expensive equipment.

L3 ANSWER 2 OF 17 USPATFULL on STN
AN 2006:80385 USPATFULL
TI Nanoparticles having oligonucleotides attached thereto and uses therefor
IN Mirkin, Chad A., Wilmette, IL, UNITED STATES
Letsinger, Robert L., Wilmette, IL, UNITED STATES
Mucic, Robert C., Glendale, CA, UNITED STATES
Storhoff, James J., Evanston, IL, UNITED STATES
Elghanian, Robert, Skokie, IL, UNITED STATES
Taton, Thomas Andrew, Little Canada, MN, UNITED STATES
Garimella, Viswanadham, Evanston, IL, UNITED STATES
Li, Zhi, Evanston, IL, UNITED STATES
Park, So-Jung, Evanston, IL, UNITED STATES
Lu, Gang, Evanston, IL, UNITED STATES
PA Nanosphere, Inc. (U.S. corporation)
PI US 2006068378 A1 20060330
AI US 2005-50983 A1 20050204 (11)
RLI Continuation of Ser. No. US 2001-8978, filed on 7 Dec 2001, GRANTED, Pat. No. US 6984491 Continuation-in-part of Ser. No. US 2001-927777, filed on 10 Aug 2001, ABANDONED Continuation-in-part of Ser. No. US 2001-820279, filed on 28 Mar 2001, GRANTED, Pat. No. US 6750016 Continuation-in-part of Ser. No. US 2001-760500, filed on 12 Jan 2001, GRANTED, Pat. No. US 6767702 Continuation-in-part of Ser. No. US 2000-603830, filed on 26 Jun 2000, GRANTED, Pat. No. US 6506564 Continuation-in-part of Ser. No. US 1999-344667, filed on 25 Jun 1999, GRANTED, Pat. No. US 6361944 Continuation-in-part of Ser. No. US 1999-240755, filed on 29 Jan 1999, ABANDONED Continuation-in-part of Ser. No. WO 1997-US12783, filed on 21 Jul 1997, PENDING
PRAI US 2000-254418P 20001208 (60)
US 2000-255236P 20001211 (60)
US 2001-282640P 20010409 (60)
US 2000-224631P 20000811 (60)
US 2000-192699P 20000328 (60)
US 2000-254392P 20001208 (60)
US 2000-255235P 20001211 (60)
US 2000-176409P 20000113 (60)
US 2000-213906P 20000626 (60)
US 2000-200161P 20000426 (60)

US 1996-31809P 19960729 (60)
DT Utility
FS APPLICATION
LREP MCDONNELL BOEHNEN HULBERT & BERGHOFF LLP, 300 S. WACKER DRIVE, 32ND FLOOR, CHICAGO, IL, 60606, US
CLMN Number of Claims: 29
ECL Exemplary Claim: 1-598
DRWN 70 Drawing Page(s)
LN.CNT 8652
CAS INDEXING IS AVAILABLE FOR THIS PATENT.
AB The invention provides methods of detecting a nucleic acid. The methods comprise contacting the nucleic acid with one or more types of particles having oligonucleotides attached thereto. In one embodiment of the method, the oligonucleotides are attached to nanoparticles and have sequences complementary to portions of the sequence of the nucleic acid. A detectable change (preferably a color change) is brought about as a result of the hybridization of the oligonucleotides on the nanoparticles to the nucleic acid. The invention also provides compositions and kits comprising particles. The invention further provides methods of synthesizing unique nanoparticle-oligonucleotide conjugates, the conjugates produced by the methods, and methods of using the conjugates. In addition, the invention provides nanomaterials and nanostructures comprising nanoparticles and methods of nanofabrication utilizing nanoparticles. Finally, the invention provides a method of separating a selected nucleic acid from other nucleic acids.

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

L3 ANSWER 3 OF 17 WPIDS COPYRIGHT 2006 THE THOMSON CORP on STN
DUPLICATE 1
AN 2004-440357 [41] WPIDS
CR 1998-145263; 2001-061976; 2001-451868; 2001-656926; 2002-258024; 2002-608256; 2003-092900; 2003-174167; 2003-182627; 2003-198491; 2003-228114; 2003-228115; 2003-237646; 2003-247253; 2003-430409; 2003-479398; 2003-521746; 2003-576420; 2003-596264; 2003-596265; 2003-615795; 2003-634854; 2003-810979; 2003-863931; 2003-897536; 2004-059018; 2004-059019; 2004-059020; 2004-059754; 2004-783783; 2005-019280; 2005-091829; 2006-182759
DNC C2004-164963 [41]
TI Nanoparticles useful for detection and separation of nucleic acids e.g. genes associated with disease, in a diagnostic assay, comprise several oligonucleotides attached to them
DC B04; D16
IN ELGHANIAN R; GARIMELLA V; LETSINGER R L; LI Z; MIRKIN C A; MUCIC R C; STORHOFF J J; TATON T A
PA (NANO-N) NANOSPHERE INC
CYC 1
PIA US 20040110220 A1 20040610 (200441)* EN 142[46]
ADT US 20040110220 A1 Provisional US 1996-31809P 19960729; US 20040110220 A1 CIP of WO 1997-US12783 19970721; US 20040110220 A1 CIP of US 1999-240755 19990129; US 20040110220 A1 CIP of US 1999-344667 19990625; US 20040110220 A1 Provisional US 2000-176409P 20000113; US 20040110220 A1 Provisional US 2000-200161P 20000426; US 20040110220 A1 Provisional US 2000-213906P 20000626; US 20040110220 A1 CIP of US 2000-603830 20000626; US 20040110220 A1 Div Ex US 2001-760500 20010112; US 20040110220 A1 US 2003-716829 20031118
FDT US 20040110220 A1 CIP of US 6361944 B; US 20040110220 A1 CIP of US 6506564 B
PRAI US 2003-716829 20031118
US 1996-31809P 19960729
WO 1997-US12783 19970721
US 1999-240755 19990129
US 1999-344667 19990625

US 2000-176409P 20000113
US 2000-200161P 20000426
US 2000-213906P 20000626
US 2000-603830 20000626
US 2001-760500 20010112
AN 2004-440357 [41] WPIDS
CR 1998-145263; 2001-061976; 2001-451868; 2001-656926; 2002-258024; 2002-608256; 2003-092900; 2003-174167; 2003-182627; 2003-198491; 2003-228114; 2003-228115; 2003-237646; 2003-247253; 2003-430409; 2003-479398; 2003-521746; 2003-576420; 2003-596264; 2003-596265; 2003-615795; 2003-634854; 2003-810979; 2003-863931; 2003-897536; 2004-059018; 2004-059019; 2004-059020; 2004-059754; 2004-783783; 2005-019280; 2005-091829; 2006-182759
AB US 20040110220 A1 UPAB: 20050906
NOVELTY - A nanoparticle having several different oligonucleotides attached to it, is new.

DETAILED DESCRIPTION - INDEPENDENT CLAIMS are included for the following:

(1) detection (M1) of a nucleic acid (preferably having at least two portions (P1 and P2)) involves contacting the nucleic acid with a type (preferably at least two types (T1 and T2)) of nanoparticles having oligonucleotides attached to it; and observing a detectable change due to hybridization of the oligonucleotides with the nucleic acid. The oligonucleotides on each nanoparticle have a sequence complementary to that of at least two portions of the nucleic acid;

(2) an aggregate probe comprising at least two types of nanoparticles with oligonucleotides attached to them;

(3) a core probe comprising at least two types of nanoparticles having oligonucleotides attached to them and the nanoparticles are bound to each other as a result of the hybridization of some of the oligonucleotides attached to them;

(4) a satellite probe comprising a particle with attached oligonucleotides, and probe oligonucleotides hybridized to the oligonucleotides attached to the particles. The oligonucleotides of the particles have two portions (Q1 and Q2) complementary to (P1) and (P2) respectively;

(5) nanofabrication (M2) involving contacting at least one (preferably two) type of the nanoparticles to form the nanomaterial or nanostructure. The oligonucleotides attached to both types of the nanoparticles have sequences complementary to each other;

(6) a kit (K1) comprising either at least one container that holds a composition comprising at least two types (preferably (T1) and (T2)) of the nanoparticles; at least two containers holding (T1) and (T2) respectively; a substrate with attached (T1) and a container holding (T2); or at least three containers holding nanoparticles and two types of oligonucleotides having sequences complementary to (P1) and (P2) respectively;

(7) a kit (K2) comprising a container holding the satellite probe, the aggregate probe, or the core probe; and

(8) binding (M3) the oligonucleotides to charged nanoparticles to produce stable nanoparticle-oligonucleotide conjugates, involving: contacting the oligonucleotides and the nanoparticles in water to allow binding of at least some of the oligonucleotides to the nanoparticles; adding at least one salt to the water; and continuing the contacting in the salt solution for an additional period. The ionic strength of the resultant salt solution is such that the process overcomes at least partially the electrostatic attraction or repulsion of the oligonucleotides for the nanoparticles and the electrostatic repulsion of the oligonucleotides for each other.

USE - For detection and separation of nucleic acids (e.g. viral NA, a gene associated with a disease, bacterial DNA, fungal DNA, synthetic NA, structurally-modified NA, NA from biological sources, or product of a polymerase chain reaction amplification) (claimed) for diagnosis of

various diseases e.g. genetic, bacterial, and viral; and for forensics, DNA sequencing, paternity testing and monitoring gene therapy.

ADVANTAGE - The nanoparticle-oligonucleotide conjugates are stable, hence efficacy, sensitivity, and accuracy of the diagnostic assays is improved. The oligonucleotides or the nanoparticles produce color changes visible to naked eyes, hence the detection and subsequent diagnosis is simple, economical and fast; and can be carried out in the field (e.g. health centers) thereby provide inexpensive first-line screening.

L3 ANSWER 4 OF 17 USPATFULL on STN
AN 2004:94779 USPATFULL
TI Nanoparticles having oligonucleotides attached thereto and uses therefor
IN Mirkin, Chad A., Wilmette, IL, UNITED STATES
Letsinger, Robert L., Bloomington, IN, UNITED STATES
Mucic, Robert C., Glendale, CA, UNITED STATES
Storhoff, James J., Evanston, IL, UNITED STATES
Elghanian, Robert, Skokie, IL, UNITED STATES
Taton, Thomas A., Little Canada, MN, UNITED STATES
Garimella, Viswanadham, Evanston, IL, UNITED STATES
Li, Zhi, Evanston, IL, UNITED STATES
Park, So-Jung, Austin, TX, UNITED STATES
PA Nanosphere, Inc. (U.S. corporation)
PI US 2004072231 A1 20040415
AI US 2003-640618 A1 20030813 (10)
RLI Division of Ser. No. US 2001-820279, filed on 28 Mar 2001, PENDING Continuation-in-part of Ser. No. US 2001-760500, filed on 12 Jan 2001, PENDING Continuation-in-part of Ser. No. US 2000-603830, filed on 26 Jun 2000, GRANTED, Pat. No. US 6506564 Continuation-in-part of Ser. No. US 1999-344667, filed on 25 Jun 1999, GRANTED, Pat. No. US 6361944 Continuation-in-part of Ser. No. US 1999-240755, filed on 29 Jan 1999, ABANDONED Continuation-in-part of Ser. No. WO 1997-US12783, filed on 21 Jul 1997, PENDING
PRAI US 2000-255235P 20001211 (60)
US 2000-254392P 20001208 (60)
US 2000-192699P 20000328 (60)
DT Utility
FS APPLICATION
LREP Emily Miao, McDonnell Boehnen Hulbert & Berghoff, 32nd Floor, 300 S. Wacker Drive, Chicago, IL, 60606
CLMN Number of Claims: 570
ECL Exemplary Claim: 1
DRWN 63 Drawing Page(s)
LN.CNT 11118
CAS INDEXING IS AVAILABLE FOR THIS PATENT.
AB The invention provides methods of detecting a nucleic acid. The methods comprise contacting the nucleic acid with one or more types of particles having oligonucleotides attached thereto. In one embodiment of the method, the oligonucleotides are attached to nanoparticles and have sequences complementary to portions of the sequence of the nucleic acid. A detectable change (preferably a color change) is brought about as a result of the hybridization of the oligonucleotides on the nanoparticles to the nucleic acid. The invention also provides compositions and kits comprising particles. The invention further provides methods of synthesizing unique nanoparticle-oligonucleotide conjugates, the conjugates produced by the methods, and methods of using the conjugates. In addition, the invention provides nanomaterials and nanostructures comprising nanoparticles and methods of nanofabrication utilizing nanoparticles. Finally, the invention provides a method of separating a selected nucleic acid from other nucleic acids.

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

L3 ANSWER 5 OF 17 USPATFULL on STN
AN 2004:69995 USPATFULL
TI Nanoparticle polyanion conjugates and methods of use thereof in detecting analytes
IN Storhoff, James J., Evanston, IL, UNITED STATES
Letsinger, Robert L., Bloomington, IN, UNITED STATES
Hagenow, Susan R., Salem, WI, UNITED STATES
PA Nanosphere, Inc. (U.S. corporation)
PI US 2004053222 A1 20040318
AI US 2003-612422 A1 20030702 (10)
PRAI US 2002-393255P 20020702 (60)
DT Utility
FS APPLICATION
LREP Emily Miao, McDonnell Boehnen Hulbert & Berghoff, 32nd Floor, 300 S. Wacker Drive, Chicago, IL, 60606
CLMN Number of Claims: 50
ECL Exemplary Claim: 1
DRWN 6 Drawing Page(s)
LN.CNT 1179
CAS INDEXING IS AVAILABLE FOR THIS PATENT.
AB This invention provides polyanionic polymer conjugates containing non-nucleotide polyanionic polymers that are useful in detecting target analytes such as proteins or small molecules. The invention also provides nanoparticles bound to polyanionic polymer conjugates and methods of preparation and use thereof. The polyanionic polymer conjugates have the formula:

L--O--[PO.sub.2--O--Z--O].sub.n--PO.sub.2--O--X

wherein n ranges from 1 to 200; L represents a moiety comprising a functional group for attaching the polyanion polymer to the nanoparticle surface; Z represents a bridging group, and X represents Q, X' or --Q--X', wherein Q represents a functional group for attaching a recognition probe to the polyanion polymer, and X' represents a recognition probe.

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

L3 ANSWER 6 OF 17 WPIDS COPYRIGHT 2006 THE THOMSON CORP on STN
AN 2003-430409 [40] WPIDS
CR 1998-145263; 2001-061976; 2001-451868; 2001-656926; 2002-258024; 2002-608256; 2003-092900; 2003-174167; 2003-182627; 2003-198491; 2003-228114; 2003-228115; 2003-237646; 2003-247253; 2003-479398; 2003-521746; 2003-576420; 2003-596264; 2003-596265; 2003-615795; 2003-634854; 2003-810979; 2003-863931; 2003-897536; 2004-059018; 2004-059019; 2004-059020; 2004-059754; 2004-440357; 2004-783783; 2005-019280; 2005-091829; 2006-182759
DNC C2003-113834 [40]
DNN N2003-343591 [40]
TI Detecting nucleic acid having two portions, by providing nanoparticles having oligonucleotides attached to it, contacting nucleic acid and nanoparticles to allow hybridization, and observing detectable change
DC B04; D16; L03; S03; U11
IN LETSINGER R L; LU G; MIRKIN C A; PARK S; TATON T A; ELGHANIAN R; GARIMELLA V; LI Z; MUCIC R C; STORHOFF J J
PA (LETS-I) LETSINGER R L; (LUGG-I) LU G; (MIRK-I) MIRKIN C A; (NANO-N) NANOSPHERE INC; (TATO-I) TATON T A
CYC 99
PIA WO 2003035829 A2 20030501 (200340)* EN 467[71]
US 20030087242 A1 20030508 (200345) EN
AU 2002363062 A1 20030506 (200461) EN
EP 1478774 A2 20041124 (200477) EN

JP 2005525084 W 20050825 (200560) JA 172
US 6984491 B2 20060110 (200604) EN

ADT WO 2003035829 A2 WO 2002-US32088 20021008; US 20030087242 A1 Provisional US 1996-31809P 19960729; US 20030087242 A1 CIP of WO 1997-US12783 19970721; US 20030087242 A1 CIP of US 1999-240755 19990129; US 20030087242 A1 CIP of US 1999-344667 19990625; US 20030087242 A1 Provisional US 2000-176409P 20000113; US 20030087242 A1 Provisional US 2000-192699P 20000328; US 20030087242 A1 Provisional US 2000-200161P 20000426; US 20030087242 A1 Provisional US 2000-213906P 20000626; US 20030087242 A1 CIP of US 2000-603830 20000626; US 20030087242 A1 Provisional US 2000-224631P 20000811; US 20030087242 A1 Provisional US 2000-254392P 20001208; US 20030087242 A1 Provisional US 2000-254418P 20001208; US 20030087242 A1 Provisional US 2000-255235P 20001211; US 20030087242 A1 Provisional US 2000-255236P 20001211; US 20030087242 A1 CIP of US 2001-760500 20010112; US 20030087242 A1 CIP of US 2001-820279 20010328; US 20030087242 A1 Provisional US 2001-282640P 20010409; US 20030087242 A1 CIP of US 2001-927777 20010810; US 20030087242 A1 US 2001-8978 20011207; AU 2002363062 A1 AU 2002-363062 20021008; EP 1478774 A2 EP 2002-799155 20021008; EP 1478774 A2 WO 2002-US32088 20021008; JP 2005525084 W WO 2002-US32088 20021008; JP 2005525084 W JP 2003-538330 20021008; US 6984491 B2 Provisional US 1996-31809P 19960729; US 6984491 B2 CIP of WO 1997-US12783 19970721; US 6984491 B2 CIP of US 1999-240775 19990129; US 6984491 B2 CIP of US 1999-344667 19990625; US 6984491 B2 Provisional US 2000-176409P 20000113; US 6984491 B2 Provisional US 2000-192699P 20000328; US 6984491 B2 Provisional US 2000-200161P 20000426; US 6984491 B2 Provisional US 2000-213906P 20000626; US 6984491 B2 CIP of US 2000-603830 20000626; US 6984491 B2 Provisional US 2000-224631P 20000811; US 6984491 B2 Provisional US 2000-254392P 20001208; US 6984491 B2 Provisional US 2000-254418P 20001208; US 6984491 B2 Provisional US 2000-255235P 20001211; US 6984491 B2 Provisional US 2000-255236P 20001211; US 6984491 B2 CIP of US 2001-760500 20010112; US 6984491 B2 CIP of US 2001-820279 20010328; US 6984491 B2 Provisional US 2001-282640P 20010409; US 6984491 B2 CIP of US 2001-927777 20010810; US 6984491 B2 US 2001-8978 20011207

FDT US 20030087242 A1 CIP of US 6361944 B; AU 2002363062 A1 Based on WO 2003035829 A; EP 1478774 A2 Based on WO 2003035829 A; JP 2005525084 W Based on WO 2003035829 A; US 6984491 B2 CIP of US 6361944 B; US 6984491 B2 CIP of US 6506564 B; US 6984491 B2 CIP of US 6750016 B; US 6984491 B2 CIP of US 6767702 B

PRAI US 2001-8978 20011207
US 2001-327864P 20011009
US 1996-31809P 19960729
WO 1997-US12783 19970721
US 1999-240755 19990129
US 1999-344667 19990625
US 2000-176409P 20000113
US 2000-192699P 20000328
US 2000-200161P 20000426
US 2000-213906P 20000626
US 2000-603830 20000626
US 2000-224631P 20000811
US 2000-254392P 20001208
US 2000-254418P 20001208
US 2000-255235P 20001211
US 2000-255236P 20001211
US 2001-760500 20010112
US 2001-820279 20010328
US 2001-282640P 20010409
US 2001-927777 20010810
US 1999-240775 19990129

AN 2003-430409 [40] WPIDS

CR 1998-145263; 2001-061976; 2001-451868; 2001-656926; 2002-258024; 2002-608256; 2003-092900; 2003-174167; 2003-182627; 2003-198491; 2003-228114; 2003-228115; 2003-237646; 2003-247253; 2003-479398; 2003-521746; 2003-576420; 2003-596264; 2003-596265; 2003-615795;

2003-634854; 2003-810979; 2003-863931; 2003-897536; 2004-059018; 2004-059019; 2004-059020; 2004-059754; 2004-440357; 2004-783783; 2005-019280; 2005-091829; 2006-182759

AB WO 2003035829 A2 UPAB: 20060119

NOVELTY - Detecting (M1) nucleic acid having two portions, comprising providing nanoparticles having oligonucleotides attached to it, which has a sequence complementary to sequence of two portions of nucleic acid, contacting nucleic acid and nanoparticles, to allow hybridization of oligonucleotides with two or more portions of nucleic acid, and observing a detectable change brought about by hybridization, is new.

DETAILED DESCRIPTION - INDEPENDENT CLAIMS are also included for the following:

(1) a kit comprising a container holding a composition comprising two types of nanoparticles having oligonucleotides attached to it, where the oligonucleotides on the first type of nanoparticles has a sequence complementary to the sequence of a first portion of a nucleic acid, and the oligonucleotides on the second type of nanoparticles has a sequence complementary to the sequence of a second portion of the nucleic acid;

(2) an aggregate probe comprising at least two types of nanoparticles having oligonucleotides attached to it, where the nanoparticles of the aggregate probe is bound to each other as a result of the hybridization of some of the oligonucleotides attached to them, and has oligonucleotides having attached to it which have a sequence complementary to a portion of the sequence of a nucleic acid;

(3) a core probe comprising at least two types of nanoparticles having oligonucleotides attached to it, where the nanoparticles is bound to each other as a result of hybridization of some of the oligonucleotides attached to it;

(4) a substrate having nanoparticles attached to it;

(5) a metallic or semiconductor nanoparticle having oligonucleotides attached to it, where the oligonucleotides are labeled with fluorescent molecules at the ends not attached to the nanoparticle;

(6) a satellite probe comprising a particle having oligonucleotides attached to it, and probe oligonucleotides hybridized to the oligonucleotides attached to the nanoparticles, and having a first portion and a second portion, where the first portion has a sequence complementary to the sequence of the first portion of oligonucleotides attached to the particles, and both portions has sequences complementary to portions of the sequence of the nucleic acid, and the probe oligonucleotide further has a reporter molecule attached to one end;

(7) a composition comprising at least two types of nanoparticles having oligonucleotides attached to it;

(8) an assembly of containers comprising a first and second containers holding nanoparticles having oligonucleotides attached to it, which has a sequence complementary to that of the oligonucleotides attached to the nanoparticles in the containers;

(9) a nanoparticle (I) having several different oligonucleotides attached to it which comprises recognition oligonucleotides, each comprising a spacer portion designed so that it is bound to the nanoparticle, and a recognition portion having a sequence complementary to a portion of the sequence of the nucleic acid or another oligonucleotide, and optionally a type of diluent oligonucleotides;

(10) binding (M2) oligonucleotides to charged nanoparticles to produce stable nanoparticle-oligonucleotide conjugates;

(11) nanoparticle-oligonucleotide conjugates (II) which are nanoparticles having oligonucleotides attached to them which is present on the surface of the nanoparticles at a surface density sufficient so that the conjugates are stable and having a sequence complementary to a portion of the sequence of a nucleic acid or another

oligonucleotide, and a covalently bound cyclic disulfide or polythiol functional group;

(12) oligonucleotides having a covalently bound cyclic disulfide or polythiol functional group that can bind to the nanoparticles;

(13) nanomaterials (III) or nanostructures composed of nanoparticles having oligonucleotides attached to it, where the nanoparticles are held together by oligonucleotide connectors;

(14) detection of an analyte, preferably polyvalent analyte;

(15) preparing a nanoprobe conjugate for detecting an analyte;

(16) a nanomaterial produced, by providing linking oligonucleotide comprising two portions, two types of nanoparticles having oligonucleotides attached to it, and a complex comprised of streptavidin or avidin bound to two or more biotin molecules, each having an oligonucleotide bound to the biotin molecule, which has a sequence that is complementary to the second portion of the linking oligonucleotide, and contacting the first and second types of nanoparticles, the linking oligonucleotides and the complex, to allow hybridization of the oligonucleotides on the nanoparticles to each other and to the linking oligonucleotide and the hybridization of the oligonucleotide of the complexes to the linking oligonucleotides so that a desired nanomaterials or nanostructures is formed;

(17) accelerating movement of a nanoparticle to an electrode surface; and

(18) increasing stringency of hybridization that employs a substrate having bound to capture oligonucleotide probes and labeled oligonucleotide detection probes.

USE - M1, (I), (II) and the aggregate probe are useful for detecting two or more nucleic acids (from a biological source) having at least two portions, such as viral RNA, bacterial or fungal DNA, a gene associated with a disease, synthetic, or structurally-modified natural or synthetic RNA or DNA, or a product of a polymerase chain reaction amplification. (II) is useful for preparing a nanoprobe conjugate for detecting an analyte, and for detecting a nucleic acid bound to an electrode surface. (I) and (II) are useful for fabrication, and for separating a selected nucleic acid having two portions from other nucleic acids. (I), (II) and the aggregate probe are useful for detecting an analyte (especially polyvalent analyte) in a sample. (All claimed.)

ADVANTAGE - Diagnostic assays employing (II) improve the sensitivity of the assay.

L3 ANSWER 7 OF 17 WPIDS COPYRIGHT 2006 THE THOMSON CORP on STN
AN 2003-615795 [58] WPIDS
CR 1998-145263; 2001-061976; 2001-451868; 2001-656926; 2002-258024; 2002-608256; 2003-092900; 2003-174167; 2003-182627; 2003-198491; 2003-228114; 2003-228115; 2003-237646; 2003-247253; 2003-430409; 2003-479398; 2003-521746; 2003-576420; 2003-596264; 2003-596265; 2003-634854; 2003-810979; 2003-863931; 2003-897536; 2004-059018; 2004-059019; 2004-059020; 2004-059754; 2004-440357; 2004-783783; 2005-019280; 2005-091829; 2006-182759
DNC C2003-167921 [58]
DNN N2003-490341 [58]
TI Detecting nucleic acid having two portions, by providing nanoparticles having oligonucleotides attached to it, contacting nucleic acid and nanoparticles to allow hybridization, and observing detectable change
DC B04; D16; S03
IN ELGHANIAN R; LETSINGER R L; MIRKIN C A; MUCIC R C; STORHOFF J J; TATON T A
PA (NANO-N) NANOSPHERE INC
CYC 1
PIA US 20030049630 A1 20030313 (200358)* EN 129[41]
US 6759199 B2 20040706 (200444) EN

ADT US 20030049630 A1 Provisional US 1996-31809P 19960729; US 20030049630 A1 CIP of WO 1997-US12783 19970721; US 20030049630 A1 CIP of US 1999-240755 19990129; US 20030049630 A1 CIP of US 1999-344667 19990625; US 20030049630 A1 Provisional US 2000-200161P 20000426; US 20030049630 A1 Cont of US 2000-603830 20000626; US 20030049630 A1 US 2001-957318 20010920; US 6759199 B2 Provisional US 1996-31809P 19960729; US 6759199 B2 CIP of WO 1997-US12783 19970721; US 6759199 B2 CIP of US 1999-240755 19990129; US 6759199 B2 CIP of US 1999-344667 19990625; US 6759199 B2 Provisional US 2000-200161P 20000426; US 6759199 B2 Cont of US 2000-603830 20000626; US 6759199 B2 US 2001-957318 20010920

FDT US 20030049630 A1 CIP of US 6361944 B; US 6759199 B2 CIP of US 6361944 B; US 6759199 B2 Cont of US 6506564 B

PRAI US 2001-957318 20010920
US 1996-31809P 19960729
WO 1997-US12783 19970721
US 1999-240755 19990129
US 1999-344667 19990625
US 2000-200161P 20000426
US 2000-603830 20000626

AN 2003-615795 [58] WPIDS

CR 1998-145263; 2001-061976; 2001-451868; 2001-656926; 2002-258024; 2002-608256; 2003-092900; 2003-174167; 2003-182627; 2003-198491; 2003-228114; 2003-228115; 2003-237646; 2003-247253; 2003-430409; 2003-479398; 2003-521746; 2003-576420; 2003-596264; 2003-596265; 2003-634854; 2003-810979; 2003-863931; 2003-897536; 2004-059018; 2004-059019; 2004-059020; 2004-059754; 2004-440357; 2004-783783; 2005-019280; 2005-091829; 2006-182759

AB US 20030049630 A1 UPAB: 20050904

NOVELTY - Detecting (M1) nucleic acid having two portions, involving providing nanoparticles having oligonucleotides attached to it, which has a sequence complementary to a sequence of two portions of nucleic acid, contacting nucleic acid and nanoparticles, to allow hybridization of oligonucleotides with two or more portions of nucleic acid, and observing a detectable change brought about by hybridization, is new.

DETAILED DESCRIPTION - INDEPENDENT CLAIMS are also included for the following:

(1) a kit comprising a container holding a composition comprising two types of nanoparticles having oligonucleotides attached to it, where the oligonucleotides on the first type of nanoparticles have a sequence complementary to the sequence of a first portion of a nucleic acid, and the oligonucleotides on the second type of nanoparticles have a sequence complementary to the sequence of a second portion of the nucleic acid;

(2) an aggregate probe comprising at least two types of nanoparticles having oligonucleotides attached to it, where the nanoparticles of the aggregate probe are bound to each other as a result of the hybridization of some of the oligonucleotides attached to them, and has oligonucleotides attached to it which have a sequence complementary to a portion of the sequence of a nucleic acid;

(3) a core probe comprising at least two types of nanoparticles having oligonucleotides attached to it, where the nanoparticles are bound to each other as a result of hybridization of some of the oligonucleotides attached to it;

(4) a substrate having nanoparticles attached to it;

(5) a metallic or semiconductor nanoparticle having oligonucleotides attached to it, where the oligonucleotides are labeled with fluorescent molecules at the ends not attached to the nanoparticle;

(6) a satellite probe comprising a particle having oligonucleotides attached to it, and probe oligonucleotides hybridized to the oligonucleotides attached to the nanoparticles, and having a first portion and a second portion, where the first portion has a sequence complementary to the sequence of the first portion of oligonucleotides attached to the particles, and both portions have sequences complementary

to portions of the sequence of the nucleic acid, and the probe oligonucleotide further has a reporter molecule attached to one end;

(7) a composition comprising at least two types of nanoparticles having oligonucleotides attached to it;

(8) an assembly of containers comprising first and second containers holding nanoparticles having oligonucleotides attached to it, which has a sequence complementary to that of the oligonucleotides attached to the nanoparticles in the containers;

(9) a nanoparticle (I) having several different oligonucleotides attached to it;

(10) binding (M2) oligonucleotides to charged nanoparticles to produce stable nanoparticle-oligonucleotide conjugates;

(11) nanoparticle-oligonucleotide conjugates (II) which are nanoparticles having oligonucleotides attached to them which are present on the surface of the nanoparticles at a surface density sufficient so that the conjugates are stable and having a sequence complementary to a portion of the sequence of a nucleic acid or another oligonucleotide, and a covalently bound cyclic disulfide or polythiol functional group;

(12) nanomaterials (III) or nanostructures composed of nanoparticles having oligonucleotides attached to it, where the nanoparticles are held together by oligonucleotide connectors; and

(13) a kit for detecting an analyte, comprising a container holding (II), and optional support for observing a detectable change.

USE - M1, (I), (II) and the aggregate probe are useful for detecting two or more nucleic acids (from a biological source) having at least two portions, such as viral RNA, bacterial or fungal DNA, a gene associated with a disease, synthetic, or structurally-modified natural or synthetic RNA or DNA, or a product of a polymerase chain reaction amplification. (II) is useful for preparing a nanoprobe conjugate for detecting an analyte, and for detecting a nucleic acid bound to an electrode surface. (I) and (II) are useful for nanofabrication, and for separating a selected nucleic acid having two portions from other nucleic acids (all claimed).

ADVANTAGE - Diagnostic assays employing (II) improve the sensitivity of the assay.

L3 ANSWER 8 OF 17 USPATFULL on STN
AN 2003:294281 USPATFULL
TI Nanoparticles having oligonucleotides attached thereto and uses therefor
IN Park, So-Jung, Austin, TX, UNITED STATES
Taton, Thomas Andrew, Little Canada, MN, UNITED STATES
Mirkin, Chad A., Wilmette, IL, UNITED STATES
PI US 2003207296 A1 20031106
AI US 2002-266983 A1 20021008 (10)
RLI Continuation-in-part of Ser. No. US 2001-8978, filed on 7 Dec 2001, PENDING Continuation-in-part of Ser. No. US 2001-927777, filed on 10 Aug 2001, PENDING Continuation-in-part of Ser. No. US 2001-820279, filed on 28 Mar 2001, PENDING Continuation-in-part of Ser. No. US 2001-760500, filed on 12 Jan 2001, PENDING Continuation-in-part of Ser. No. US 2000-603830, filed on 26 Jun 2000, GRANTED, Pat. No. US 6506564 Continuation-in-part of Ser. No. US 1999-344667, filed on 25 Jun 1999, GRANTED, Pat. No. US 6361944 Continuation-in-part of Ser. No. US 1999-240755, filed on 29 Jan 1999, ABANDONED Continuation-in-part of Ser. No. WO 1997-US12783, filed on 21 Jul 1997, PENDING
PRAI US 2001-327864P 20011009 (60)
US 2000-254418P 20001208 (60)
US 2000-255236P 20001211 (60)
US 2001-282640P 20010409 (60)
US 2000-224631P 20000811 (60)

US 2000-192699P 20000328 (60)
US 2000-254392P 20001208 (60)
US 2000-255235P 20001211 (60)
US 2000-176409P 20000113 (60)
US 2000-213906P 20000626 (60)
US 2000-200161P 20000426 (60)
US 1996-31809P 19960729 (60)
DT Utility
FS APPLICATION
LREP MCDONNELL BOEHNEN HULBERT & BERGHOFF, 300 SOUTH WACKER DRIVE, SUITE 3200, CHICAGO, IL, 60606
CLMN Number of Claims: 677
ECL Exemplary Claim: 1
DRWN 75 Drawing Page(s)
LN.CNT 12981
CAS INDEXING IS AVAILABLE FOR THIS PATENT.
AB The invention provides methods of detecting a nucleic acid. The methods comprise contacting the nucleic acid with one or more types of particles having oligonucleotides attached thereto. In one embodiment of the method, the oligonucleotides are attached to nanoparticles and have sequences complementary to portions of the sequence of the nucleic acid. A detectable change (preferably a color change) is brought about as a result of the hybridization of the oligonucleotides on the nanoparticles to the nucleic acid. The invention also provides compositions and kits comprising particles. The invention further provides methods of synthesizing unique nanoparticle-oligonucleotide conjugates, the conjugates produced by the methods, and methods of using the conjugates. In addition, the invention provides nanomaterials and nanostructures comprising nanoparticles and methods of nanofabrication utilizing nanoparticles. Finally, the invention provides a method of separating a selected nucleic acid from other nucleic acids.

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

L3 ANSWER 9 OF 17 USPATFULL on STN
AN 2003:207240 USPATFULL
TI Bioconjugate-nanoparticle probes
IN Garimella, Viswanadham, Evanston, IL, UNITED STATES
Storhoff, James J., Evanston, IL, UNITED STATES
PI US 2003143598 A1 20030731
AI US 2002-291291 A1 20021108 (10)
PRAI US 2001-348239P 20011109 (60)
DT Utility
FS APPLICATION
LREP MCDONNELL BOEHNEN HULBERT & BERGHOFF, 300 SOUTH WACKER DRIVE, SUITE 3200, CHICAGO, IL, 60606
CLMN Number of Claims: 99
ECL Exemplary Claim: 1
DRWN 9 Drawing Page(s)
LN.CNT 1472
CAS INDEXING IS AVAILABLE FOR THIS PATENT.
AB The invention provides nanoparticle-bioconjugate probes that are useful for detecting target analytes such as nucleic acids. The probes of the invention are stable towards heat and resistant to displacement by thiol containing compounds such as DTT (dithiothreitol).

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

L3 ANSWER 10 OF 17 USPATFULL on STN
AN 2003:127030 USPATFULL
TI Nanoparticles having oligonucleotides attached thereto and uses therefor
IN Mirkin, Chad A., Wilmette, IL, UNITED STATES

Letsinger, Robert L., Wilmette, IL, UNITED STATES
Taton, Thomas Andrew, Little Canada, MN, UNITED STATES
Lu, Gang, Mt Prospect, IL, UNITED STATES
PI US 2003087242 A1 20030508
US 6984491 B2 20060110
AI US 2001-8978 A1 20011207 (10)
RLI Continuation-in-part of Ser. No. US 2001-927777, filed on 10 Aug 2001, PENDING Continuation-in-part of Ser. No. US 2001-820279, filed on 28 Mar 2001, PENDING Continuation-in-part of Ser. No. US 2001-760500, filed on 12 Jan 2001, PENDING Continuation-in-part of Ser. No. US 2000-603830, filed on 26 Jun 2000, PENDING Continuation-in-part of Ser. No. US 1999-344667, filed on 25 Jun 1999, GRANTED, Pat. No. US 6361944 Continuation-in-part of Ser. No. US 1999-240755, filed on 29 Jan 1999, ABANDONED Continuation-in-part of Ser. No. WO 1997-US12783, filed on 21 Jul 1997, UNKNOWN
PRAI US 1996-31809P 19960729 (60)
US 2000-176409P 20000113 (60)
US 2000-192699P 20000328 (60)
US 2000-200161P 20000426 (60)
US 2000-213906P 20000626 (60)
US 2000-224631P 20000811 (60)
US 2000-254392P 20001208 (60)
US 2000-254418P 20001208 (60)
US 2000-255235P 20001211 (60)
US 2000-255236P 20001211 (60)
US 2001-282640P 20010409 (60)
DT Utility
FS APPLICATION
LREP MCDONNELL BOEHNEN HULBERT & BERGHOFF, 300 SOUTH WACKER DRIVE, SUITE 3200, CHICAGO, IL, 60606
CLMN Number of Claims: 626
ECL Exemplary Claim: 1
DRWN 71 Drawing Page(s)
LN.CNT 12308
CAS INDEXING IS AVAILABLE FOR THIS PATENT.
AB The invention provides methods of detecting a nucleic acid. The methods comprise contacting the nucleic acid with one or more types of particles having oligonucleotides attached thereto. In one embodiment of the method, the oligonucleotides are attached to nanoparticles and have sequences complementary to portions of the sequence of the nucleic acid. A detectable change (preferably a color change) is brought about as a result of the hybridization of the oligonucleotides on the nanoparticles to the nucleic acid. The invention also provides compositions and kits comprising particles. The invention further provides methods of synthesizing unique nanoparticle-oligonucleotide conjugates, the conjugates produced by the methods, and methods of using the conjugates. In addition, the invention provides nanomaterials and nanostructures comprising nanoparticles and methods of nanofabrication utilizing nanoparticles. Finally, the invention provides a method of separating a selected nucleic acid from other nucleic acids.

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

L3 ANSWER 11 OF 17 USPATFULL on STN
AN 2003:99341 USPATFULL
TI Protein and peptide nanoarrays
IN Mirkin, Chad A., Evanston, IL, UNITED STATES
Della Cioppa, Guy, Chicago, IL, UNITED STATES
Demers, Linette, Chicago, IL, UNITED STATES
Lee, Ki-Bum, Evanston, IL, UNITED STATES
Park, So-Jung, Evanston, IL, UNITED STATES
PA Northwestern University (U.S. corporation)
PI US 2003068446 A1 20030410

AI US 2002-261663 A1 20021002 (10)
PRAI US 2001-326767P 20011002 (60)
DT Utility
FS APPLICATION
LREP FOLEY AND LARDNER, SUITE 500, 3000 K STREET NW, WASHINGTON, DC, 20007
CLMN Number of Claims: 165
ECL Exemplary Claim: 1
DRWN 5 Drawing Page(s)
LN.CNT 2235
CAS INDEXING IS AVAILABLE FOR THIS PATENT.
AB Ultrahigh resolution patterning, preferably carried out by dip-pen nanolithographic printing, can be used to construct peptide and protein nanoarrays with nanometer-level dimensions. The peptide and protein nanoarrays, for example, exhibit almost no detectable nonspecific binding of proteins to their passivated portions. This work demonstrates how dip pen nanolithographic printing can be used in a method to generate high density protein and peptide patterns, which exhibit bioactivity and virtually no non-specific adsorption. It also shows that one can use AFM-based screening procedures to study the reactivity of the features that comprise such nanoarrays. The method encompasses a wide range of protein and peptide structures including, for example, enzymes and antibodies. Features at or below 300 nm can be achieved.

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

L3 ANSWER 12 OF 17 USPATFULL on STN
AN 2003:30222 USPATFULL
TI Nanoparticles having oligonucleotides attached thereto and uses therefor
IN Mirkin, Chad A., Wilmette, IL, UNITED STATES
Letsinger, Robert L., Wilmette, IL, UNITED STATES
Park, So-Jung, Evanston, IL, UNITED STATES
PI US 2003022169 A1 20030130
US 6750016 B2 20040615
AI US 2001-820279 A1 20010328 (9)
RLI Continuation-in-part of Ser. No. US 2001-760500, filed on 12 Jan 2001, PENDING Continuation-in-part of Ser. No. US 1999-344667, filed on 25 Jun 1999, GRANTED, Pat. No. US 6361944 Continuation-in-part of Ser. No. US 1999-240755, filed on 29 Jan 1999, ABANDONED Continuation-in-part of Ser. No. WO 1997-US12783, filed on 21 Jul 1997, UNKNOWN
PRAI US 1996-31809P 19960729 (60)
US 2000-176409P 20000113 (60)
US 2000-200161P 20000426 (60)
US 2000-192699P 20000328 (60)
US 2000-254392P 20001208 (60)
US 2000-255235P 20001211 (60)
DT Utility
FS APPLICATION
LREP MCDONNELL BOEHNEN HULBERT & BERGHOFF, 300 SOUTH WACKER DRIVE, SUITE 3200, CHICAGO, IL, 60606
CLMN Number of Claims: 570
ECL Exemplary Claim: 1
DRWN 65 Drawing Page(s)
LN.CNT 11127
CAS INDEXING IS AVAILABLE FOR THIS PATENT.
AB The invention provides methods of detecting a nucleic acid. The methods comprise contacting the nucleic acid with one or more types of particles having oligonucleotides attached thereto. In one embodiment of the method, the oligonucleotides are attached to nanoparticles and have sequences complementary to portions of the sequence of the nucleic acid. A detectable change (preferably a color change) is brought about as a result of the hybridization of the oligonucleotides on the nanoparticles to the nucleic acid. The invention also provides compositions and kits comprising particles. The invention further

provides methods of synthesizing unique nanoparticle-oligonucleotide conjugates, the conjugates produced by the methods, and methods of using the conjugates. In addition, the invention provides nanomaterials and nanostructures comprising nanoparticles and methods of nanofabrication utilizing nanoparticles. Finally, the invention provides a method of separating a selected nucleic acid from other nucleic acids.F

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

L3 ANSWER 13 OF 17 WPIDS COPYRIGHT 2006 THE THOMSON CORP on STN
AN 2002-608256 [65] WPIDS
CR 1998-145263; 2001-061976; 2001-451868; 2001-656926; 2002-258024; 2003-092900; 2003-174167; 2003-182627; 2003-198491; 2003-228114; 2003-228115; 2003-237646; 2003-247253; 2003-430409; 2003-479398; 2003-521746; 2003-576420; 2003-596264; 2003-596265; 2003-615795; 2003-634854; 2003-810979; 2003-863931; 2003-897536; 2004-059018; 2004-059019; 2004-059020; 2004-059754; 2004-440357; 2004-783783; 2005-019280; 2005-091829; 2006-182759
DNC C2002-171859 [65]
TI Detecting nucleic acid having two portions, by providing nanoparticles having oligonucleotides attached to it, contacting nucleic acid and nanoparticles to allow hybridization, and observing detectable change
DC B04; D16
IN ELGHANIAN R; GARIMELLA V; LETSINGER R L; LI Z; MIRKIN C A; MUCIC R C; PARK S; PARK S J; STORHOFF J J; TATON T A; LU G
PA (ELGH-I) ELGHANIAN R; (GARI-I) GARIMELLA V; (LETS-I) LETSINGER R L; (LIZZ-I) LI Z; (MIRK-I) MIRKIN C A; (MUCI-I) MUCIC R C; (NANO-N) NANOSPHERE INC; (PARK-I) PARK S; (STOR-I) STORHOFF J J; (TATO-I) TATON T A
CYC 97
PIA WO 2002046472 A2 20020613 (200265)* EN 442[67]
AU 2002030593 A 20020618 (200266) EN
US 20020172953 A1 20021121 (200279) EN
EP 1356109 A2 20031029 (200379) EN
AU 2002230593 A8 20051013 (200611) EN
US 20060068378 A1 20060330 (200624) EN
ADT WO 2002046472 A2 WO 2001-US46418 20011207; US 20020172953 A1 Provisional US 1996-31809P 19960729; US 20020172953 A1 CIP of WO 1997-US12783 19970721; US 20020172953 A1 CIP of US 1999-240755 19990129; US 20020172953 A1 CIP of US 1999-344667 19990625; US 20020172953 A1 Provisional US 2000-176409P 20000113; US 20020172953 A1 Provisional US 2000-192699P 20000328; US 20020172953 A1 Provisional US 2000-200161P 20000426; US 20020172953 A1 CIP of US 2000-603830 20000626; US 20020172953 A1 Provisional US 2000-224631P 20000811; US 20020172953 A1 Provisional US 2000-254392P 20001208; US 20020172953 A1 Provisional US 2000-255235P 20001211; US 20020172953 A1 CIP of US 2001-760500 20010112; US 20020172953 A1 CIP of US 2001-820279 20010328; US 20020172953 A1 US 2001-927777 20010810; EP 1356109 A2 EP 2001-990826 20011207; EP 1356109 A2 WO 2001-US46418 20011207; AU 2002030593 A AU 2002-30593 20011207; AU 2002230593 A8 AU 2002-230593 20011207; US 20060068378 A1 Provisional US 1996-31809P 19960729; US 20060068378 A1 CIP of WO 1997-US12783 19970721; US 20060068378 A1 CIP of US 1999-240755 19990129; US 20060068378 A1 CIP of US 1999-344667 19990625; US 20060068378 A1 Provisional US 2000-176409P 20000113; US 20060068378 A1 Provisional US 2000-192699P 20000328; US 20060068378 A1 Provisional US 2000-200161P 20000426; US 20060068378 A1 Provisional US 2000-213906P 20000626; US 20060068378 A1 CIP of US 2000-603830 20000626; US 20060068378 A1 Provisional US 2000-224631P 20000811; US 20060068378 A1 Provisional US 2000-254392P 20001208; US 20060068378 A1 Provisional US 2000-254418P 20001208; US 20060068378 A1 Provisional US 2000-255235P 20001211; US 20060068378 A1 Provisional US 2000-255236P 20001211; US 20060068378 A1 CIP of US 2001-760500 20010112; US 20060068378 A1 CIP of US 2001-820279 20010328; US 20060068378 A1 Provisional US 2001-282640P 20010409; US 20060068378 A1 CIP of US

2001-927777 20010810; US 20060068378 A1 Cont of US 2001-8978 20011207; US 20060068378 A1 US 2005-50983 20050204

FDT US 20020172953 A1 CIP of US 6361944 B; AU 2002030593 A Based on WO 2002046472 A; EP 1356109 A2 Based on WO 2002046472 A; AU 2002230593 A8 Based on WO 2002046472 A; US 20060068378 A1 CIP of US 6361944 B; US 20060068378 A1 CIP of US 6506564 B; US 20060068378 A1 CIP of US 6750016 B; US 20060068378 A1 CIP of US 6767702 B; US 20060068378 A1 Cont of US 6984491 B

PRAI US 2001-927777 20010810
US 2000-254418P 20001208
US 2000-254392P 20001208
US 2000-255236P 20001211
US 2000-255235P 20001211
US 2001-760500 20010112
US 2001-820279 20010328
US 2001-282640P 20010409
US 1996-31809P 19960729
WO 1997-US12783 19970721
US 1999-240755 19990129
US 1999-344667 19990625
US 2000-176409P 20000113
US 2000-192699P 20000328
US 2000-200161P 20000426
US 2000-603830 20000626
US 2000-224631P 20000811
US 2000-213906P 20000626
US 2001-8978 20011207
US 2005-50983 20050204

AN 2002-608256 [65] WPIDS

CR 1998-145263; 2001-061976; 2001-451868; 2001-656926; 2002-258024; 2003-092900; 2003-174167; 2003-182627; 2003-198491; 2003-228114; 2003-228115; 2003-237646; 2003-247253; 2003-430409; 2003-479398; 2003-521746; 2003-576420; 2003-596264; 2003-596265; 2003-615795; 2003-634854; 2003-810979; 2003-863931; 2003-897536; 2004-059018; 2004-059019; 2004-059020; 2004-059754; 2004-440357; 2004-783783; 2005-019280; 2005-091829; 2006-182759

AB WO 2002046472 A2 UPAB: 20060120

NOVELTY - Detecting (M1) nucleic acid having two portions, involves providing nanoparticles having oligonucleotides attached to it, which has a sequence complementary to sequence of two portions of nucleic acid, contacting nucleic acid and nanoparticles, to allow hybridization of oligonucleotides with two or more portions of nucleic acid, and observing a detectable change brought about by hybridization.

DETAILED DESCRIPTION - INDEPENDENT CLAIMS are also included for the following:

(1) a kit comprising a container holding a composition comprising two types of nanoparticles having oligonucleotides attached to it, where the oligonucleotides on the first type of nanoparticles has a sequence complementary to the sequence of a first portion of a nucleic acid, and the oligonucleotides on the second type of nanoparticles has a sequence complementary to the sequence of a second portion of the nucleic acid;

(2) an aggregate probe comprising at least two types of nanoparticles having oligonucleotides attached to it, where the nanoparticles of the aggregate probe is bound to each other as a result of the hybridization of some of the oligonucleotides attached to them, and has oligonucleotides having attached to it which have a sequence complementary to a portion of the sequence of a nucleic acid;

(3) a core probe comprising at least two types of nanoparticles having oligonucleotides attached to it, where the nanoparticles is bound to each other as a result of hybridization of some of the oligonucleotides attached to it;

(4) a substrate having nanoparticles attached to it;

(5) a metallic or semiconductor nanoparticle having

oligonucleotides attached to it, where the oligonucleotides are labeled with fluorescent molecules at the ends not attached to the nanoparticle;

(6) a satellite probe comprising a particle having oligonucleotides attached to it, and probe oligonucleotides hybridized to the oligonucleotides attached to the nanoparticles, and having a first portion and a second portion, where the first portion has a sequence complementary to the sequence of the first portion of oligonucleotides attached to the particles, and both portions has sequences complementary to portions of the sequence of the nucleic acid, and the probe oligonucleotide further has a reporter molecule attached to one end;

(7) a composition comprising at least two types of nanoparticles having oligonucleotides attached to it;

(8) an assembly of containers comprising a first and second containers holding nanoparticles having oligonucleotides attached to it, which has a sequence complementary to that of the oligonucleotides attached to the nanoparticles in the containers;

(9) a nanoparticle (I) having several different oligonucleotides attached to it which comprises recognition oligonucleotides, each comprising a spacer portion designed so that it is bound to the nanoparticle, and a recognition portion having a sequence complementary to a portion of the sequence of the nucleic acid or another oligonucleotide, and optionally a type of diluent oligonucleotides;

(10) binding (M2) oligonucleotides to charged nanoparticles to produce stable nanoparticle-oligonucleotide conjugates;

(11) nanoparticle-oligonucleotide conjugates (II) which are nanoparticles having oligonucleotides attached to them which is present on the surface of the nanoparticles at a surface density sufficient so that the conjugates are stable and having a sequence complementary to a portion of the sequence of a nucleic acid or another oligonucleotide, and a covalently bound cyclic disulfide or polythiol functional group;

(12) oligonucleotides having a covalently bound cyclic disulfide or polythiol functional group that can bind to the nanoparticles;

(13) a nanoparticle conjugate for detecting an analyte, comprising nanoparticles having oligonucleotides bound to it, and oligonucleotide having bound to it a specific binding complement of an analyte having a sequence that is complementary to a portion of the oligonucleotides bound to the nanoparticles and are bound, as a result of hybridization, and a linker oligonucleotide having two portions;

(14) nonmaterials (III) or nanostructures composed of nanoparticles having oligonucleotides attached to it, where the nanoparticles are held together by oligonucleotide connectors;

(15) a kit for detecting an analyte, comprising a container holding (II), and optional support for observing a detectable change;

(16) a nanomaterial produced, by providing linking oligonucleotide comprising two portions, two types of nanoparticles having oligonucleotides attached to it, and a complex comprised of streptavidin or avidin bound to two or more biotin molecules, each having an oligonucleotide bound to the biotin molecule, which has a sequence that is complementary to the second portion of the linking oligonucleotide, and contacting the first and second types of nanoparticles, the linking oligonucleotides and the complex, to allow hybridization of the oligonucleotides on the nanoparticles to each other and to the linking oligonucleotide and the hybridization of the oligonucleotide of the complexes to the linking oligonucleotides so that a desired nanomaterials or nanostructures is formed; and

(17) accelerating movement of a nanoparticle to an electrode

surface.

USE - (M1), (I), (II) and the aggregate probe are useful for detecting two or more nucleic acids (from a biological source) having at least two portions, such as viral RNA, bacterial or fungal DNA, a gene associated with a disease, synthetic, or structurally-modified natural or synthetic RNA or DNA, or a product of a polymerase chain reaction amplification. (II) is useful for preparing a nanoprobe conjugate for detecting an analyte, and for detecting a nucleic acid bound to an electrode surface. (I) and (II) are useful for fabrication, and for separating a selected nucleic acid having two portions from other nucleic acids. (I), (II) and the aggregate probe are useful for detecting an analyte (especially polyvalent analyte) in a sample (all claimed).

ADVANTAGE - Diagnostic assays employing (II) improve the sensitivity of the assay.

L3 ANSWER 14 OF 17 WPIDS COPYRIGHT 2006 THE THOMSON CORP on STN
AN 2003-479398 [45] WPIDS
CR 1998-145263; 2001-061976; 2001-451868; 2001-656926; 2002-258024; 2002-608256; 2003-092900; 2003-174167; 2003-182627; 2003-198491; 2003-228114; 2003-228115; 2003-237646; 2003-247253; 2003-430409; 2003-521746; 2003-576420; 2003-596264; 2003-596265; 2003-615795; 2003-634854; 2003-810979; 2003-863931; 2003-897536; 2004-059018; 2004-059019; 2004-059020; 2004-059754; 2004-440357; 2004-783783; 2005-019280; 2005-091829; 2006-182759
DNC C2003-128014 [45]
TI Detecting nucleic acids having two portions, by providing nanoparticles having oligonucleotides attached to them, contacting the nucleic acid and nanoparticles to allow hybridization, and observing any detectable changes
DC B04; D16
IN ELGHANIAN R; LETSINGER R L; MIRKIN C A; MUCIC R C; STORHOFF J J; TATON T A
PA (NANO-N) NANOSPHERE INC
CYC 1
PIA US 20020160381 A1 20021031 (200345)* EN 99[41]
US 6861221 B2 20050301 (200516) EN
ADT US 20020160381 A1 Provisional US 1996-31809P 19960729; US 20020160381 A1 CIP of WO 1997-US12783 19970721; US 20020160381 A1 CIP of US 1999-240755 19990129; US 20020160381 A1 CIP of US 1999-344667 19990625; US 20020160381 A1 Provisional US 2000-200161P 20000426; US 20020160381 A1 Cont of US 2000-603830 20000626; US 20020160381 A1 US 2001-975498 20011011; US 6861221 B2 Provisional US 1996-31809P 19960729; US 6861221 B2 CIP of WO 1997-US12783 19970721; US 6861221 B2 CIP of US 1999-240755 19990129; US 6861221 B2 CIP of US 1999-344667 19990625; US 6861221 B2 Provisional US 2000-200161P 20000426; US 6861221 B2 Cont of US 2000-603830 20000626; US 6861221 B2 US 2001-975498 20011011
FDT US 6861221 B2 CIP of US 6361944 B; US 6861221 B2 Cont of US 6506564 B
PRAI US 2001-975498 20011011
US 1996-31809P 19960729
WO 1997-US12783 19970721
US 1999-240755 19990129
US 1999-344667 19990625
US 2000-200161P 20000426
US 2000-603830 20000626
AN 2003-479398 [45] WPIDS
CR 1998-145263; 2001-061976; 2001-451868; 2001-656926; 2002-258024; 2002-608256; 2003-092900; 2003-174167; 2003-182627; 2003-198491; 2003-228114; 2003-228115; 2003-237646; 2003-247253; 2003-430409; 2003-521746; 2003-576420; 2003-596264; 2003-596265; 2003-615795; 2003-634854; 2003-810979; 2003-863931; 2003-897536; 2004-059018; 2004-059019; 2004-059020; 2004-059754; 2004-440357; 2004-783783; 2005-019280; 2005-091829; 2006-182759
AB US 20020160381 A1 UPAB: 20050903
NOVELTY - Detecting (M1) nucleic acid (NA) having two portions, involves providing nanoparticles (NPs) having oligonucleotides (ONTs)

attached to them, which have a sequence complementary to the sequence of the two portions of NA, contacting NA and NPs, to allow hybridization of ONTs with two or more portions of NA, and observing a detectable change brought about by hybridization.

DETAILED DESCRIPTION - INDEPENDENT CLAIMS are included for:

(1) a kit comprising a container holding a composition comprising two types of NPs having ONTs attached to it;

(2) an aggregate probe comprising at least two types of NPs having ONTs attached to it;

(3) a core probe comprising at least two types of NPs having ONTs attached to it;

(4) a substrate having NPs attached to it;

(5) a metallic or semiconductor NP having ONTs attached to it, where the ONTs are labeled with fluorescent molecules at the ends not attached to the NP;

(6) a satellite probe comprising a particle having ONTs attached to it, and probe ONTs hybridized to the ONTs attached to the NPs;

(7) a composition comprising at least two types of NPs having ONTs attached to it;

(8) an assembly of containers comprising a first and second containers holding NPs having ONTs attached to it, which has a sequence complementary to that of the ONTs attached to the NPs in the containers;

(9) a NP (I) having several different ONTs attached to it, the ONTs comprising at least one type of recognition ONTs, each of the recognition ONTs comprising a spacer portion and a recognition portion, the spacer portion being designed so that it is bound to the NPs, the recognition portion having a sequence complementary to at least one portion of the sequence of a nucleic acid or another ONT;

(10) binding (M2) ONTs to charged NPs to produce stable NP-ONT conjugates;

(11) NP-ONT conjugates (II) which are NPs having ONTs attached to them which is present on the surface of the NPs at a surface density sufficient so that the conjugates are stable and having a sequence complementary to a portion of the sequence of a NA or another ONT, and a covalently bound cyclic disulfide or polythiol functional group;

(12) nanomaterials (III) or nanostructures composed of NPs having ONTs attached to it, where the NPs are held together by ONT connectors; and

(13) a kit comprising a substrate having attached to it at least one pair of electrodes with oligonucleotides attached to the substrate between the electrodes.

USE - (M1), (I), (II) and the aggregate probe are useful for detecting two or more NAs (from a biological source) having at least two portions. The nucleic acid is viral RNA or DNA, bacterial or fungal DNA, a gene associated with a disease, synthetic, or structurally-modified natural or synthetic RNA or DNA, or a product of a polymerase chain reaction amplification. (II) is useful for preparing a nanoprobe conjugate for detecting an analyte, and for detecting a NA bound to an electrode surface. (I) and (II) are useful for fabrication, and for separating a selected NA having two portions from other NAs (all claimed).

ADVANTAGE - Diagnostic assays employing (II) improve the sensitivity of the assay.

L3 ANSWER 15 OF 17 WPIDS COPYRIGHT 2006 THE THOMSON CORP on STN
AN 2003-174167 [17] WPIDS
CR 1998-145263; 2001-061976; 2001-451868; 2001-656926; 2002-258024; 2002-608256; 2003-092900; 2003-182627; 2003-198491; 2003-228114; 2003-228115; 2003-237646; 2003-247253; 2003-430409; 2003-479398; 2003-521746; 2003-576420; 2003-596264; 2003-596265; 2003-615795; 2003-634854; 2003-810979; 2003-863931; 2003-897536; 2004-059018; 2004-059019; 2004-059020; 2004-059754; 2004-440357; 2004-783783; 2005-019280; 2005-091829; 2006-182759
DNC C2003-045481 [17]
TI Detecting nucleic acid having two portions, by providing

nanoparticles having oligonucleotides attached to it, contacting nucleic acid and nanoparticles to allow hybridization, and observing detectable change

DC B04; D16

IN ELGHANIAN R; LETSINGER R L; MIRKIN C A; MUCIC R C; STORHOFF J J; TATON T A

PA (NANO-N) NANOSPHERE INC

CYC 1

PIA US 20020146720 A1 20021010 (200317)* EN 132[41]
US 6582921 B2 20030624 (200343) EN

ADT US 20020146720 A1 Provisional US 1996-31809P 19960729; US 20020146720 A1 CIP of WO 1997-US12783 19970721; US 20020146720 A1 CIP of US 1999-240755 19990129; US 20020146720 A1 CIP of US 1999-344667 19990625; US 20020146720 A1 Provisional US 2000-200161P 20000426; US 20020146720 A1 Cont of US 2000-603830 20000626; US 20020146720 A1 US 2001-961949 20010920

FDT US 20020146720 A1 CIP of US 6361944 B

PRAI US 2001-961949 20010920
US 1996-31809P 19960729
WO 1997-US12783 19970721
US 1999-240755 19990129
US 1999-344667 19990625
US 2000-200161P 20000426
US 2000-603830 20000626

AN 2003-174167 [17] WPIDS

CR 1998-145263; 2001-061976; 2001-451868; 2001-656926; 2002-258024; 2002-608256; 2003-092900; 2003-182627; 2003-198491; 2003-228114; 2003-228115; 2003-237646; 2003-247253; 2003-430409; 2003-479398; 2003-521746; 2003-576420; 2003-596264; 2003-596265; 2003-615795; 2003-634854; 2003-810979; 2003-863931; 2003-897536; 2004-059018; 2004-059019; 2004-059020; 2004-059754; 2004-440357; 2004-783783; 2005-019280; 2005-091829; 2006-182759

AB US 20020146720 A1 UPAB: 20050903

NOVELTY - Detecting (M1) nucleic acid having two portions, comprising providing nanoparticles having oligonucleotides attached to it, which has a sequence complementary to sequence of two portions of nucleic acid, contacting nucleic acid and nanoparticles, to allow hybridization of oligonucleotides with portions of nucleic acid, and observing a detectable change brought about by hybridization, is new.

DETAILED DESCRIPTION - INDEPENDENT CLAIMS are also included for the following:

(1) an aggregate probe comprising at least two types of nanoparticles having oligonucleotides attached to it, where the nanoparticles of the aggregate probe is bound to each other as a result of the hybridization of some of the oligonucleotides attached to them, and has oligonucleotides having attached to it which have a sequence complementary to a portion of the sequence of a nucleic acid;

(2) a core probe comprising at least two types of nanoparticles having oligonucleotides attached to it, where the nanoparticles is bound to each other as a result of hybridization of some of the oligonucleotides attached to it;

(3) a kit comprising a container holding a composition comprising two types of nanoparticles having oligonucleotides attached to it, where the oligonucleotides on the first type of nanoparticles has a sequence complementary to the sequence of a first portion of a nucleic acid, and the oligonucleotides on the second type of nanoparticles has a sequence complementary to the sequence of a second portion of the nucleic acid, and also comprising the core probe;

(4) a substrate having nanoparticles attached to it;

(5) a metallic or semiconductor nanoparticle having oligonucleotides attached to it, where the oligonucleotides are labeled with fluorescent molecules at the ends not attached to the nanoparticle;

(6) a satellite probe comprising a particle having oligonucleotides attached to it, and probe oligonucleotides hybridized to the oligonucleotides attached to the nanoparticles, and having a first portion and a second portion, where the first portion has a sequence

complementary to the sequence of the first portion of oligonucleotides attached to the particles, and both portions has sequences complementary to portions of the sequence of the nucleic acid, and the probe oligonucleotide further has a reporter molecule attached to one end;

(7) a composition comprising at least two types of nanoparticles having oligonucleotides attached to it;

(8) an assembly of containers comprising a first and second containers holding nanoparticles having oligonucleotides attached to it, which has a sequence complementary to that of the oligonucleotides attached to the nanoparticles in the containers;

(9) a nanoparticle (I) having several different oligonucleotides attached to it which comprises recognition oligonucleotides, each comprising a spacer portion designed so that it is bound to the nanoparticle, and a recognition portion having a sequence complementary to a portion of the sequence of the nucleic acid or another oligonucleotide, and optionally a type of diluent oligonucleotides;

(10) binding (M2) oligonucleotides to charged nanoparticles to produce stable nanoparticle-oligonucleotide conjugates;

(11) nanoparticle-oligonucleotide conjugates (II) which are nanoparticles having oligonucleotides attached to them which is present on the surface of the nanoparticles at a surface density sufficient so that the conjugates are stable and having a sequence complementary to a portion of the sequence of a nucleic acid or another oligonucleotide, and a covalently bound cyclic disulfide or polythiol functional group;

(12) oligonucleotides having a covalently bound cyclic disulfide or polythiol functional group that can bind to the nanoparticles;

(13) a nanoparticle conjugate for detecting an analyte, comprising nanoparticles having oligonucleotides bound to it, and oligonucleotide having bound to it a specific binding complement of an analyte having a sequence that is complementary to a portion of the oligonucleotides bound to the nanoparticles and are bound, as a result of hybridization, and a linker oligonucleotide having two portions;

(14) nonmaterials (III) or nanostructures composed of nanoparticles having oligonucleotides attached to it, where the nanoparticles are held together by oligonucleotide connectors;

(15) a kit for detecting an analyte, comprising a container holding (II), and optional support for observing a detectable change; and

(16) a nanomaterial produced, by providing linking oligonucleotide comprising two portions, two types of nanoparticles having oligonucleotides attached to it, and a complex comprised of streptavidin or avidin bound to two or more biotin molecules, each having an oligonucleotide bound to the biotin molecule, which has a sequence that is complementary to the second portion of the linking oligonucleotide, and contacting the first and second types of nanoparticles, the linking oligonucleotides and the complex, to allow hybridization of the oligonucleotides on the nanoparticles to each other and to the linking oligonucleotide and the hybridization of the oligonucleotide of the complexes to the linking oligonucleotides so that a desired nanomaterials or nanostructures is formed.

USE - M1, (I), (II) and the aggregate probe are useful for detecting two or more nucleic acids (from a biological source) having at least two portions, such as viral RNA, bacterial or fungal DNA, a gene associated with a disease, synthetic, or structurally-modified natural or synthetic RNA or DNA, or a product of a polymerase chain reaction amplification. (II) is useful for preparing a nanoprobe conjugate for detecting an analyte, and for detecting a nucleic acid bound to an

electrode surface. (I) and (II) are useful for fabrication, and for separating a selected nucleic acid having two portions from other nucleic acids. (I), (II) and the aggregate probe are useful for detecting an analyte (especially polyvalent analyte) in a sample. (All claimed.)

ADVANTAGE - Diagnostic assays employing (II) improve the sensitivity of the assay.

L3 ANSWER 16 OF 17 USPATFULL on STN
AN 2002:307830 USPATFULL
TI Movement of biomolecule-coated nanoparticles in an electric field
IN Mirkin, Chad A., Wilmette, IL, UNITED STATES
Letsinger, Robert L., Wilmette, IL, UNITED STATES
Mucic, Robert C., Glendale, CA, UNITED STATES
Storhoff, James J., Evanston, IL, UNITED STATES
Elghanian, Robert, Chicago, IL, UNITED STATES
Taton, Thomas Andrew, Chicago, IL, UNITED STATES
Garimella, Viswanadham, Evanston, IL, UNITED STATES
Li, Zhi, Evanston, IL, UNITED STATES
Park, So-Jung, Evanston, IL, UNITED STATES
PI US 2002172953 A1 20021121
AI US 2001-927777 A1 20010810 (9)
RLI Continuation-in-part of Ser. No. US 2001-820279, filed on 28 Mar 2001, PENDING Continuation-in-part of Ser. No. US 2001-760500, filed on 12 Jan 2001, PENDING Continuation-in-part of Ser. No. US 2000-603830, filed on 26 Jun 2000, PENDING Continuation-in-part of Ser. No. US 1999-344667, filed on 25 Jun 1999, GRANTED, Pat. No. US 6361944 Continuation-in-part of Ser. No. US 1999-240755, filed on 29 Jan 1999, ABANDONED Continuation-in-part of Ser. No. WO 1997-US12783, filed on 21 Jul 1997, UNKNOWN
PRAI US 1996-31809P 19960729 (60)
US 2000-176409P 20000113 (60)
US 2000-200161P 20000426 (60)
US 2000-192699P 20000328 (60)
US 2000-254392P 20001208 (60)
US 2000-255235P 20001211 (60)
US 2000-224631P 20000811 (60)
DT Utility
FS APPLICATION
LREP Emily Miao, McDonnell Boehnen Hulbert & Berghoff, 32nd Floor, 300 S. Wacker Drive, Chicago, IL, 60606
CLMN Number of Claims: 598
ECL Exemplary Claim: 1
DRWN 64 Drawing Page(s)
LN.CNT 11435
CAS INDEXING IS AVAILABLE FOR THIS PATENT.
AB The invention provides methods of detecting a nucleic acid. The methods comprise contacting the nucleic acid with one or more types of particles having oligonucleotides attached thereto. In one embodiment of the method, the oligonucleotides are attached to nanoparticles and have sequences complementary to portions of the sequence of the nucleic acid. A detectable change (preferably a color change) is brought about as a result of the hybridization of the oligonucleotides on the nanoparticles to the nucleic acid. The invention also provides compositions and kits comprising particles. The invention further provides methods of synthesizing unique nanoparticle-oligonucleotide conjugates, the conjugates produced by the methods, and methods of using the conjugates. In addition, the invention provides nanomaterials and nanostructures comprising nanoparticles and methods of nanofabrication utilizing nanoparticles. Finally, the invention provides a method of separating a selected nucleic acid from other nucleic acids.

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

L3 ANSWER 17 OF 17 USPATFULL on STN
AN 2002:280008 USPATFULL
TI Nanoparticles having oligonucleotides attached thereto and uses therefor
IN Mirkin, Chad A., Wilmette, IL, UNITED STATES
Letsinger, Robert L., Wilmette, IL, UNITED STATES
Mucic, Robert C., Glendale, CA, UNITED STATES
Storhoff, James J., Evanston, IL, UNITED STATES
Elghanian, Robert, Chicago, IL, UNITED STATES
Taton, Thomas A., Little Canada, MN, UNITED STATES
Garimella, Viswanadham, Evanston, IL, UNITED STATES
Li, Zhi, Evanston, IL, UNITED STATES
PI US 2002155442 A1 20021024
US 6767702 B2 20040727
AI US 2001-760500 A1 20010112 (9)
RLI Continuation-in-part of Ser. No. US 1999-344667, filed on 25 Jun 1999, GRANTED, Pat. No. US 6361944 Continuation-in-part of Ser. No. US 1999-240755, filed on 29 Jan 1999, ABANDONED Continuation-in-part of Ser. No. WO 1997-US12783, filed on 21 Jul 1997, UNKNOWN
PRAI US 1996-31809P 19960729 (60)
US 2000-200161P 20000426 (60)
US 2000-176409P 20000113 (60)
US 2000-213906P 20000626 (60)
DT Utility
FS APPLICATION
LREP MCDONNELL BOEHNEN HULBERT & BERGHOFF, 300 SOUTH WACKER DRIVE, SUITE 3200, CHICAGO, IL, 60606
CLMN Number of Claims: 485
ECL Exemplary Claim: 1
DRWN 51 Drawing Page(s)
LN.CNT 8754
CAS INDEXING IS AVAILABLE FOR THIS PATENT.
AB The invention provides methods of detecting a nucleic acid. The methods comprise contacting the nucleic acid with one or more types of particles having oligonucleotides attached thereto. In one embodiment of the method, the oligonucleotides are attached to nanoparticles and have sequences complementary to portions of the sequence of the nucleic acid. A detectable change (preferably a color change) is brought about as a result of the hybridization of the oligonucleotides on the nanoparticles to the nucleic acid. The invention also provides compositions and kits comprising particles. The invention further provides methods of synthesizing unique nanoparticle-oligonucleotide conjugates, the conjugates produced by the methods, and methods of using the conjugates. In addition, the invention provides nanomaterials and nanostructures comprising nanoparticles and methods of nanofabrication utilizing nanoparticles. Finally, the invention provides a method of separating a selected nucleic acid from other nucleic acids.

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

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